AF/3711

PATENT APPLICATION
ATTORNEY DOCKET No. Q46699

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In application of

Hisashi YAMAGISHI, et al.

Appln. No.: 09/129,883

Group Art Unit: 3711

Confirmation No.: Not Yet Assigned

Examiner: S. BLAU

Filed: August 6, 1998

For: MULTI-PIECE SOLID GOLF BALL

SUBMISSION OF APPELLANT'S BRIEF ON APPEAL

Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of $310.00 is attached. Authorization is also given to charge or credit any difference or overpayment to Deposit Account No. 19-4880. A duplicate copy of this paper is attached.

Respectfully submitted,

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Date: July 16, 2001

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APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Commissioner for Patents
Washington, D.C. 20231

Sir:

The following comprises the Appellants' Brief on Appeal from the Final Office Action dated November 15, 2001, rejecting claims 3-16. This Appeal Brief is filed in triplicate and is accompanied by the required appeal fee set forth in 37 C.F.R. § 1.17(c). Appellants' Notice of Appeal was timely filed on May 15, 2001, along with the statutorily required fee as set forth in 37 C.F.R. § 1.17(b). A Petition for an Extension of Time under 37 C.F.R. § 1.136 was filed concurrently with the Notice of Appeal, along with the statutorily required fee as set forth in 37 C.F.R. § 1.17(a), thereby extending the time for response to the Final Office Action of November 15, 2000 to May 15, 2001. Since the July 15, 2001 due date for filing the Appellants' Brief on Appeal was a Sunday, this Brief on Appeal was filed on July 16, 2001 in accordance with 37 C.F.R. § 1.7(a). The present Appeal Brief is timely filed.

I. REAL PARTY IN INTEREST

Appellants respectfully submit that the above-captioned application is assigned on its face to BRIDGESTONE SPORTS CO., LTD., a company organized under the laws of Japan.

II. RELATED APPEALS AND INTERFERENCES

Appellants state, that upon information and belief, they are not aware of any co-pending appeal or interference that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

This is an appeal from the Final Office Action dated November 15, 2000, wherein claims 3-16 were finally rejected.

The above-identified application was filed with claims 1-3 on August 6, 1998. A Preliminary Amendment that amended claim 3 was concurrently filed with the application. An Amendment Under 37 C.F.R. § 1.111 was filed on March 8, 2000, canceling claims 1 and 2, amending claim 3, and adding new claims 4-15. A second Amendment Under 37 C.F.R. § 1.111 was filed on September 5, 2000, amending claim 4 and adding new claim 16. An Amendment Under 37 C.F.R. § 1.116 was filed concurrently with the Appeal Brief to correct typographical errors in claims 4 and 16. No further amendments were made to the application. Accordingly, claims 3-16 (see attached Appendix) are the only claims on appeal.

IV. STATUS OF AMENDMENTS

A Response Under 37 C.F.R. § 1.116 was filed on April 16, 2001, without further amendment to the claims in response to the Final Office Action dated November 15, 2000. A Petition for an Extension of Time under 37 C.F.R. § 1.136, along with the statutorily required fee as set forth in 37 C.F.R. § 1.17(a), was filed concurrently with the Response, thereby extending the time for response to the Final Office Action of November 15, 2000 to April 15, 2001. April 15, 2001 was a Sunday, and therefore, under 37 C.F.R. § 1.7(a), April 16, 2001 was the next due date for responding to the Final Office Action.

An Amendment Under 37 C.F.R. § 1.116 to remove typographical errors in claims 4 and 16 was filed on July 16, 2001, concurrent with this Appeal Brief.

V. SUMMARY OF THE INVENTION

Appellants' invention relates to a solid golf ball having a solid core and cover comprising a two-layer structure. Applicants' solid golf ball has optimized cover hardness and dimples to improve flight distance performance (see page 1, lines 16-20 of the specification).

In general, the majority of available commercial golf balls are either multi-piece solid golf balls or thread-wound golf balls. Multi-piece solid golf balls comprise a solid core and with at least one layer of cover material. Thread-wound golf balls comprise a thread-wound core obtained by winding rubber thread about a core, and enclosed with a cover material. Improvements in multi-piece golf balls are directed to adjusting the composition and hardness of

the cover layers that control, *inter alia*, the spin rate of a struck golf ball. The desired spin rate is not always achieved since the hardness of the cover inner layer is not optimized with respect to the hardness of the cover outer layer, leading to deformation and flight trajectory problems when the golf ball is struck. In addition, it is difficult to form dimples suitable for the spin range and restitution that vary with cover hardness. (see page 1, line 32 to page 2, line 22 of the specification).

Accordingly, Appellants' invention provides a multi-piece solid golf ball having a cover layer being formed in the surface with a plurality of dimples, and the spin rate is approximately explained in terms of a product of the Shore D hardness of the cover inner layer and the Shore D hardness of the cover outer layer. Appellants' invention further provides a multi-piece solid golf ball having a proportion V_R (%) of the total of the volumes of dimple space defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given the assumption that the golf ball surface is free of dimples. Further, Appellants' invention provides a multi-piece solid golf ball having at least three types of dimples, and the dimples differ in at least one of a diameter, a depth and a value V_0 which is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom. (see page 2, line 35 to page 3, line 25 of the specification).

Specifically, Appellants' invention provides a multi-piece solid golf ball comprising a solid core, a cover inner layer and a cover outer layer. The cover layer comprises a surface being

formed with a plurality of dimples, and the spin rate is approximately explained in terms of a product of the Shore D hardness of the cover inner layer and the Shore D hardness of the cover outer layer, and having a proportion V_R (%) of the total of the volumes of dimple space defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given the assumption that the golf ball surface is free of dimples, such that any one of the following combinations is satisfied:

(1) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 1,500 and less than 2,000, and the V_R range is 0.8% to 1.1%.

(2) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,000 and less than 2,500, and the V_R range is 0.75% to 1.05%.

(3) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,500 and less than 3,000, and the V_R range is 0.7% to 1%.

(4) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,000 and less than 3,500, and the V_R range is 0.65% to 0.95%.

(5) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,500 and less than 4,000, and the V_R range is 0.6% to 0.9%.

In addition, the multi-piece solid golf ball has at least three types of dimples, and the dimples differ in at least one of a diameter, a depth and a value V_0, which is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a

cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom. (see page 3, line 31 to page 4, line 27 of the specification).

The multi-piece solid golf ball 28 comprises a solid core 20 and cover inner layer 14 and cover outer layer 16. The solid core can be formed from well-known compositions. The solid core may comprise a single layer or multiple layers. The solid core undergoes deformation or distortion of 2.6 to 6.5 mm, more preferably 2.7 and 6.3 mm, and most preferably 2.8 to 6.0 mm under an applied load of 100 kg. (see page 5, lines 7-29 of the specification; claims 4, 5 and 16).

The cover inner layer and the cover outer layer can be formed from well-known cover stocks. The cover stocks are selected such that the product of the Shore D hardness of the cover outer layer multiplied by the Shore D hardness of the cover inner layer is greater than or equal to 1,500 and less than or equal to 4,000. The Shore D hardness of the cover outer layer can be substantially the same as the Shore D hardness of the cover inner layer, softer than the Shore D hardness of the cover inner layer, or harder than the Shore D hardness of the cover inner layer. The cover outer layer has a Shore D hardness layer of up to 63, preferably 30 to 62 and more preferably 35 to 61. The cover inner layer has a Shore D hardness of 28 to 68. (see page 5, line 35 to page 6, line 27 of the specification; claims 3, 6 and 7).

The gage of the cover inner layer has a gage of 0.5 to 3.0 mm. The cover outer layer has a gage of 0.5 to 2.5 mm. The cover has a total gage of 1.0 to 5.0 mm. (see page 7, lines 5-11 of the specification; claims 8, 9 and 10).

The cover layer comprises a surface being formed with a plurality of dimples. The dimples are formed such that product of the Shore D hardness of the cover inner layer and the Shore D hardness of the cover outer layer is in the range of 1,500 to 4,000. A proportion V_R (%) of the total of the volumes of dimple space each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given the assumption that the golf ball surface is free of dimples, such that any one of the following combinations is satisfied:

(1) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 1,500 and less than 2,000, and the V_R range is 0.8% to 1.1%.

(2) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,000 and less than 2,500, and the V_R range is 0.75% to 1.05%.

(3) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,500 and less than 3,000, and the V_R range is 0.7% to 1%.

(4) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,000 and less than 3,500, and the V_R range is 0.65% to 0.95%.

(5) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,500 and less than 4,000, and the V_R range is 0.6% to 0.9%.

In addition, the multi-piece solid golf ball has at least three types of dimples, and the dimples differ in at least one of a diameter, a depth and a value V_0, which is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a

cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom. More preferred ranges of V_R are:

(1) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 1,500 and less than 2,000, and the V_R range is 0.82% to 1.08%.

(2) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,000 and less than 2,500, and the V_R range is 0.77% to 1.03%.

(3) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 2,500 and less than 3,000, and the V_R range is 0.72% to 0.98%.

(4) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,000 and less than 3,500, and the V_R range is 0.67% to 0.93%.

(5) The product of the Shore D hardnesses of the cover inner layer and cover outer layer is greater than or equal to 3,500 and less than 4,000, and the V_R range is 0.62% to 0.88%.

(see page 7, line 12 to page 8, line 17 of the specification; claims 4 and 16).

The value V_R is the sum of the volume V_P of dimple spaces defined in the golf ball, and is calculated according to the following equation:

$$V_R = \frac{V_S}{\frac{4}{3}\pi R^3} \times 100$$

V_S is the sum of the volumes V_P of dimple spaces each below a circular plane circumscribed by the dimple edge and R is a ball radius. The dimples of the golf ball must further satisfy the requirement that there are included at least three types of dimples which are different in at least

one of a diameter, a depth and value V_0. The value V_0 is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom. If there are less than three dimple types, the golf ball will loft too high or drop prematurely. (see page 8, line 23 to page 9, line 18 of the specification).

The dimples of the largest type have a diameter of 3.7 to 4.5 mm and a depth of 0.15 to 0.25 mm. The number of dimples of the largest type is 5 to 80 % of the total dimple number, and they have a V_0 of 0.38 to 0.55. The dimples of the smallest type have a diameter of 2.0 to 3.7 mm and a depth of 0.08 to 0.23 mm. The number of dimples of the smallest type is 1 to 40 % of the total dimple number, and they have a V_0 of 0.38 to 0.55. (see page 10, lines 16 to 30 of the specification; claims 11, 12, 13, 14 and 15).

VI. ISSUES

1. Whether claims 3-15 are unpatentable under 35 U.S.C. § 103(a) over Yamagishi et al. (U.S. Patent No. 5,695,413)(hereinafter Yamagishi '413) in view of Yamagishi et al. (U.S. Patent No. 5,779,563)(hereinafter Yamagishi '563).

2. Whether claim 16 is unpatentable under 35 U.S.C. § 103(a) over Hayashi et al. (U.S. Patent No. 5,816,942)(hereinafter Hayashi '942) in view of Yamagishi et al. (U.S. Patent No. 5,779,563).

VII. GROUPING OF CLAIMS

Claims 3-16 stand or fall together.

VIII. ARGUMENTS

1. Rejection of Claims 3-15 over Yamagishi '413 in view of Yamagishi '563

The Examiner has repeated his final rejection based on Yamagishi '413 in view of Yamagishi '563. The Examiner, however, has essentially admitted to using an improper standard of consideration of the scope and content of the prior art. *See* page 5, numbered paragraph 5 of the Final Office Action dated November 15, 2000. For example, the Examiner states "Yamagishi (563) was not used to show distortion values of a core but to show a known dimple pattern used on golf balls." However, the prior art must be considered in its entirety for all that it fairly teaches as well as that which it does not teach and would be considered an example of instruction leading away from the purported combination. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Appellants submit that use of Yamagishi '563 solely for the citation of a known dimple pattern used on golf balls is not only myopic, but also contrary to the statute that requires that the prior art be considered as a whole.

As a threshold matter, the Examiner cannot point to any teaching in Yamagishi '413 that discloses the product of Shore D hardness of cover outer layer and cover inner layer. Nevertheless, the Examiner contends that the Yamagishi '413 "disclosed a range of hardness for

both layers and any combination would have been an [sic] suitable otherwise Yamagishi (413) would have stated as such." *See* page 5, numbered paragraph 5 of the Final Office Action dated November 15, 2000. Clearly, the Examiner is reading more into Yamagishi '413 than it fairly teaches. The prior art is relied upon for all that it discloses and not for that which it potentially could state. Unambiguously, Yamagishi '413 does not disclose or teach the fundamental concepts defined by the Appellants. As noted in *In re Vaeck*, 947 F.2d, 488 (Fed. Cir. 1991), the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not in the applicant's disclosure.

Aside from the fact that Yamagishi '413 does not disclose any dimples, more importantly are two other defects with respect to Yamagishi '413. First, there is no criticality and thus no disclosure of the proportion of dimples V_R (%) and the value V_0 of the dimples. Yamagishi '413 is simply silent on this point.

Second, and more important, Yamagishi '413 does not disclose the product of a Shore D hardness of a cover inner layer and the Shore D hardness of a cover outer layer. This is a critical defect. Thus, Yamagishi '413 does not in any way disclose the relationship between the product of Shore D hardness of the two layers and as a result, the value of V_R of the dimples would not be expected or obvious given that fundamental precursor defect.

Consequently, even if the Shore D products in the range of 1,500 to 4,000 would be expected from the Shore D hardness of the two layers disclosed, the particular range of values of V_R corresponding to the product is simply an unobvious extrapolation of any of that information.

Thus, the two-fold defect in Yamagishi '413 is that it provides no data whatsoever concerning the product of Shore D hardness of the cover outer layer and the cover inner layer, even if that is defined as the multi-piece golf ball defined by the Examiner as pertinent, and there is no relationship between any such product and the value of V_R.

However, in order to sustain the rejection of the claims, the Examiner has misconstrued Appellants' argument concerning dimples. Appellants did not argue that Yamagishi '413 would be construed as a golf ball devoid of dimples. As set forth in the remarks beginning on the bottom of page 3 through page 4 of the Amendment Under 37 C.F.R. § 1.111 filed on September 5, 2000, Appellants recognized that all golf balls "clearly would have dimples otherwise the carry, for example, those values set forth in Table 3, could not be achieved by a golf ball which was perfectly round and devoid of dimples." Consequently, Appellants recognized that dimples would be present. The real issue, however, is not whether a pattern of dimples would be present, but rather the specific geometry of the dimple itself within the pattern. That is, the claims here are specific to the dimple per *se*.

Fundamentally, the claimed invention is predicated on the recognition that two entirely dissimilar properties of a golf ball, when limited to specific ranges, increase golf ball performance. There is nothing in the combination of Yamagishi '413 and Yamagishi '563 that discloses the fundamental recognition of a combination of a particular range of V_R in a particular range of the product of Shore D hardness of the cover inner and cover outer layers. The only way in which the combination of Yamagishi '413 and Yamagishi '563 can be recreated is by

forcibly dissecting it into components to find the individual pieces. However, even if the individual pieces or components are found, obviousness does not still exist absence of motivation or suggestion of combination. As noted in *In re Vaeck*, 947 F.2d, 488 (Fed. Cir. 1991), the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not in the applicant's disclosure. The fact that the elements in their disparate form exist does not lead to the conclusion of *prima facie* obviousness unless the artisan would have some suggestion or motivation for combination. Clearly that is not the case here, and, thus, there is no *prima facie* obviousness. Tellingly, when the applied prior art is dissected in a manner in which the Examiner has done, even the individual components cannot be reasonably said to meet those individual requirements of Appellants' claims.

Yamagishi '563 presents an irreconcilable conflict to Yamagishi '413 insofar as the construction of the golf ball is concerned. While the Examiner relies only on dimple sizing, the Examiner takes an overly restrictive and improperly narrow view of Yamagishi '563. The Yamagishi '563 reference does not satisfy the elements of the invention in so far as distortion of the solid core of a range of 2.8 to 6.5 mm under a load of 100 kg. Moreover, Yamagishi '563 does not disclose a particular proportion of V_R to a particular product of the Shore D hardness. Appellants provided a Table in the Amendment filed on March 8, 2000 showing that these examples do not correspond to Appellants' invention.

The Examiner's conclusion that it would be obvious to include the golf ball of Yamagishi '413 to have a product of Shore D hardness of the cover inner and cover outer layers thus flies directly in the face of the disclosure of Yamagishi '563. The Yamagishi '563 reference is somewhat pertinent in that it at least provides dimple data, but clearly for use in a golf ball construction having a materially different type of core.

As such, it is believed that there is no *prima facie* obviousness in the combination of Yamagishi '413 and Yamagishi '563. Even if combined in any meaningful manner, the combination does not teach a technique of taking full advantage of the spin property which is dependent on the product of Shore D hardness of the cover inner layer and cover outer layer and improving the flight performance of the golf ball to divide the range of the product into sub-ranges and then form dimples which satisfy the requirements of the proportion of V_R and the value of V_0 associated with the sub-ranges. There is simply no recognition or suggestion of that fundamental concept. Thus, the Examiner has incorrectly concluded that the product of the Shore D hardness of the cover inner layer and the cover outer layer is in the range of 1,500 to 4,000.

Yamagishi '413 discloses a cover outer layer having a Shore D hardness in the range of 50 to 60. The inner cover layer has a Shore D hardness in the range of 28 to 68. Yamagishi '413 fails to disclose, however, that is the concept that the Shore D hardness of the cover inner and cover outer layers would be selected based on a particular combination that falls within Appellants' range. Rather, the Yamagishi '413 defines hardness of the two layers as independent

considerations. Stated differently, Yamagishi '413 simply defines materials in which the hardness would fall within individual ranges. Critically, those ranges lead to values outside Appellants' claimed ranges. Thus, Yamagishi '413 does not teach or suggest that the Shore D hardness of the cover layers should be selected to fall specifically within a particular range based on a product of those Shore D hardness values.

The fallacy in the Examiner's position, however, is that even if the Shore D hardness values are multiplied together, Appellants' invention is not simply restricted to the product of the Shore D hardness values. Rather, Appellants' invention recites a clear interrelationship that for specific values of Shore D hardness, the value of V_R is constrained to a particular range. Independent claim 4 recites five distinct criteria in which the product of the Shore D hardness values for the cover inner layer and the cover outer layer is set to different ranges and for each the Shore D hardness range, a corresponding range of V_R is thus also set.

The issue of patentability, which the Examiner fails to harmonize with the combination of Yamagishi '413 and Yamagishi '563, is that for any particular product of Shore D hardness, given the values in Yamagishi '413, how if at all would Yamagishi '413 vary the value of V_R even if such parameter values were taught in the prior art? The answer is that it is entirely unknown and unresolved. The combination of Yamagishi '413 and Yamagishi '563 provides no reason or rationale to vary the dimple volume given differences in combined hardness. There is simply a void in the prior art with respect to that consideration. As such then it is respectfully contended that the Examiner's reliance on the combination of Yamagishi '413 and Yamagishi

'563 is deficient and that no *prima facie* obviousness exists.

2. Rejection of Claim 16 over Hayashi '942 in view of Yamagishi '563

The rejection of claim 16 based on Hayashi '942 in view of Yamagishi '563 suffers from the same flaws enumerated above with respect to claims 3-15. Moreover, there are more fundamental reasons as to why Hayashi '942 is irrelevant to the claimed invention. Apparently, the Examiner fails to recognize that the disclosed subject matter of Hayashi '942 concerns thread-wound golf balls and not multi-piece solid core golf balls. The technologies of multi-piece solid golf balls and thread-wound golf balls are incompatible. A thread-wound golf ball comprises a center ball, a rubber thread that is wound around the center ball, and cover layers. The fact that Hayashi '942 lacks a specific requirement for dimples does not compensate for the more fundamental defect, namely that Hayashi '942 discloses a thread-wound golf ball having fundamentally different dynamic characteristics than a multi-piece solid golf ball.

Going beyond the fundamental teaching deficiencies of Hayashi '942, the combination of Hayashi '942 and Yamagishi '563 lacks any teaching or suggestion of the claimed invention.

Moreover, the Examiner has failed to comply with the obviousness rejection touchstone, wherein "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested in the prior art." *In re Royka*, 490 F.2d 981, 180 U.S.P.Q.2d 580 (CCPA 1974). Yamagishi '563 discloses the Shore D hardness of a cover outer layer. *See* Table 4 of Yamagishi '563. In addition, data concerning the cover inner layer is provided as well, such as the material used. *See* *5 of Table 4 of Yamagishi '563. However, Yamagishi '563 does not in

any way suggest that the Shore D hardness of the cover layers be used to guide the selection of a particular dimple type. This is yet again another indication that Yamagishi '563 is completely unconcerned with the relationship between hardness of the cover layers and the selected dimple types.

If Yamagishi '563 is considered in its entirety, the artisan of ordinary skill would also recognize that Yamagishi '563 discloses values of Shore D hardness for at least the cover outer layer, as well as claims a range of Shore D hardness values. *See* claim 4 of Yamagishi '563. If Yamagishi '563 had any notion of a relationship between product of the Shore D hardness values of the cover inner layer and the cover outer layer and the dimple configuration, it would be expected that such recognition would be present. No such recognition exists, however, and the Examiner's analysis cannot provide the logic that is clearly missing in the combination of Hayashi '942 and Yamagishi '563. As such then it is respectfully contended that the Examiner's reliance on the combination of Hayashi '942 and Yamagishi '563 is deficient and that no *prima facie* obviousness exists.

IX. CONCLUSION

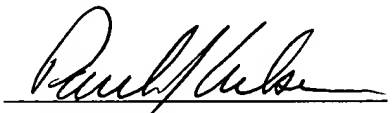
Appellants' invention takes full advantage of the spin property of a golf ball, which is dependent on the product of Shore D hardness of the cover inner layer and cover outer layer and improving the flight performance of the golf ball. The sub-ranges of the product of the Shore D hardness are associated with a proportion V_R (%) of the total of the volumes of dimple space

each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given the assumption that the golf ball surface is free of dimples. The combination of Yamagishi '413 and Yamagishi '563, as well as the combination of Hayashi '942 and Yamagishi '563, clearly fail to teach or suggest a multi-piece golf ball having improved flight performance, wherein the product of Shore D hardness of the cover inner layer and cover outer layer is associated with a proportion V_R (%) of the total of the volumes of dimple space each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given the assumption that the golf ball surface is free of dimples, as recited in claim 3-16. Accordingly, the rejection of the claims should be reversed and the claims passed to issue.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. §1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

Appellants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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Date: July 16, 2001

X. APPENDIX

CLAIMS 3-16 ON APPEAL:

3. The multi-piece solid golf ball of claim 4 wherein both the hardness of the inner and outer cover layers are up to 63 in Shore D hardness.

4. A multi-piece solid golf ball comprising; a solid core and a cover consisting of inner and outer layers surrounding the core, the outer cover layer having a surface formed with a plurality of dimples,

said solid core having a distortion of 2.8 to 6.5 mm under an applied load of 100 kg, and

a product of the Shore D hardness of said inner cover layer multiplied by the Shore D hardness of said outer cover layer and a proportion V_R (%) of the total of the volumes of dimple spaces each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given on the assumption that the golf ball surface is free of dimples satisfy any one of the following combinations (1) to (5):

(1) the product of Shore D hardnesses of inner and outer cover layers: 1,500 to less than 2,000

v_R: 0.8 to 0.93%

(2) the product of Shore D hardnesses of inner and outer cover layers: 2,000 to less than 2,500

V_R: 0.75 to 1.05%

(3) the product of Shore D hardnesses of inner and outer cover layers: 2,500 to less than 3,000

V_R: .7 to 1%

(4) the product of Shore D hardnesses of inner and outer cover layers: 3,000 to less than 3,500

V_R: 0.65 to 0.95%

(5) the product of Shore D hardnesses of inner and outer cover layers: 3,500 to 4,000

V_R: 0.6 to 0.9%,

and said dimples include at least three types of dimples which are different in at least one of, diameter, depth, and value V_0 which is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom.

5. The multi-piece solid golf ball of claim 4, wherein said solid core has a distortion of 2.8 to 6.0 mm under an applied load of 100 kg.

6. The multi-piece golf ball of claim 4, wherein said outer cover layer has a Shore D hardness in the range of 30 to 62.

7. The multi-piece golf ball of claim 4, wherein the inner cover layer has a Shore D hardness in the range of 28 to 68.

8. The multi-piece golf ball of claim 4, wherein said inner cover layer has a gage in the range of 0.5 to 3.0 mm.

9. The multi-piece golf ball of claim 4, wherein said outer cover layer has a gage in the range of 0.5 to 2.5 mm.

10. The multi-piece golf ball of claim 4, wherein said cover has a total gage of 1.0 to 5.0 mm.

11. The multi-piece golf ball of claim 4, wherein said dimples have diameters such that a largest diameter is in the range of 3.7 to 4.5 mm.

12. The multi-piece golf ball of claim 4, wherein dimple depth for a largest size dimple is in the range of 0.15 to 0.25 mm.

13. The multi-piece golf ball of claim 4, wherein V_0 is in a range of 0.4 to 0.52 for a largest size dimple.

14. The multi-piece golf ball of claim 4, wherein V_0 for the golf ball as a whole is in the range 0.38 to 0.55.

15. The multi-piece golf ball of claim 4, wherein dimples of a smallest type have a diameter in the range of 2.0 to 3.7 mm and a depth in the range of 0.08 to 0.23 mm.

16. A multi-piece solid golf ball comprising; a solid core and a cover consisting of inner and outer layers surrounding the core, the outer cover layer having a surface formed with a plurality of dimples,

said solid core having a distortion of 2.8 to 3.0 mm under an applied load of 100 kg, and

a product of the Shore D hardness of said inner cover layer multiplied by the Shore D hardness of said outer cover layer and a proportion V_R (%) of the total of the volumes of dimple spaces each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given on the assumption that the golf ball surface is free of dimples satisfy any one of the following combinations (1) to (5):

(1) the product of Shore D hardnesses of inner and outer cover layers: 1,500 to less than 2,000

v_R: 0.8 to 1.1%

(2) the product of Shore D hardnesses of inner and outer cover layers: 2,000 to less than 2,500

V_R: 0.75 to 1.05%

(3) the product of Shore D hardnesses of inner and outer cover layers: 2,500 to less than 3,000

V_R: .7 to 1%

(4) the product of Shore D hardnesses of inner and outer cover layers: 3,000 to less than 3,500

V_R: 0.65 to 0.95%

(5) the product of Shore D hardnesses of inner and outer cover layers: 3,500 to 4,000

V_R: 0.6 to 0.9%,

and said dimples include at least three types of dimples which are different in at least one of, diameter, depth, and value V_0 which is the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom.